



The genus *Indabracon* van Achterberg (Hymenoptera, Braconidae, Braconinae) in China, with description of four new species

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Abstract

The species of the braconid genus *Indabracon* van Achterberg, 1992 (Hymenoptera: Braconidae, Braconinae) from China are revised and 6 species are recognized, including 4 new species (*Indabracon albogilvus* sp. nov., *I. discolor* sp. nov., *I. nigricans* sp. nov. and *I. semicircularis* sp. nov.), which are described and illustrated. A key to the Chinese species of the genus *Indabracon* is provided.

Keywords

Hymenoptera, Braconidae, Braconinae, Braconini, *Indabracon*, new species, China

Introduction

Indabracon van Achterberg, 1992, is a small genus in the tribe Braconini Nees (Hymenoptera: Braconidae: Braconinae) with only three described species all occurring in the Oriental region (Yu et al. 2016). The biology of this genus is still unknown.

During the course of the study of the Chinese Braconidae, six species of this genus have been found in China, of which four species are new to science (*I. albogilvus* sp. nov., *I. discolor* sp. nov., *I. nigricans* sp. nov. and *I. semicircularis* sp. nov.). In the present paper, the new species are described and illustrated, and a key to the Chinese species of *Indabracon* is provided.

Material and methods

For the recognition of the subfamily Braconinae and the tribe Braconini, see van Achterberg (1990, 1993) and Chen & van Achterberg, (2019), for the terminology and measurements used in this paper, see van Achterberg (1988, 1993), and for additional references, see Yu et al. (2016). The following abbreviations are used: POL = postocellar line; OOL = ocular-ocellar line; OD = minimum diameter of posterior ocellus; T1 = first metasomal tergite; T2 = second metasomal tergite; T3 = third metasomal tergite; T4 = fourth metasomal tergite; T5 = fifth metasomal tergite; T6 = sixth metasomal tergite; T7 = seventh metasomal tergite. The medial length of the third metasomal tergite is measured from the posterior border of the second suture to the posterior margin of the tergite.

Photographs were made with a Keyence VHX-2000 digital microscope and the photos were slightly processed (mainly cropped and the background modified) in Photoshop CS6. For the descriptions and measurements, a Leica M125 stereomicroscope was used. The specimens are deposited in the Institute of Zoology, Chinese Academy of Sciences, Beijing (IZCAS).

Results

Genus *Indabracon* van Achterberg, 1992

Figs 1–8

Indabracon van Achterberg, 1992: 384; Yang, Chen and Liu 2006: 319; Chen and Yang, 2006: 122. Type species: *Spinaria trimaculata* Cameron, 1900.

Diagnosis. Body medium-sized, body length 6.0–10.0 mm; terminal flagellomere often strongly acute apically; in lateral view scapus gradually narrowed basally, without double margin at inner side apically and concave apico-laterally, ventrally weakly to distinctly longer than dorsally; eye glabrous, not or weakly emarginated; face with few rugae and rugulae or some punctures; clypeus moderately narrow, without dorsal carina; malar suture absent or present, sometimes sculptured; labio-maxillary complex normal, not elongate; frons nearly flat, with some setae and a strong median groove; mesosoma largely smooth and shiny; notauli shallow, and only present anteriorly; pleural sulcus smooth, absent medially; mesosternal sulcus smooth, shallow; ant-

cutal depression and metapleural flange narrow, sometimes protruding anteriorly; scutellar sulcus moderately wide and crenulate; metanotum strongly convex medially, and with a short median carina anteriorly; propodeum largely smooth, without medio-longitudinal carina or groove, sometimes with short crenulae posteriorly; propodeal spiracle round, near middle of propodeum, and without tubercle above it; angle between veins 1-SR and C+SC+R of fore wing about 50°; fore wing vein 1-SR+M slightly to strongly bent subbasally; fore wing vein cu-a interstitial or narrowly postfurcal; fore wing vein 1-M straight; fore wing vein CU1b medium-sized to long (slightly shorter than vein 3-CU1), slender and reclivous; fore wing vein m-cu converging to vein 1-M posteriorly; fore wing vein 1-R1 much longer than pterostigma, ending distad of apex of vein 3-M; vein 3-CU1 of fore wing slender; fore wing vein r oblique and shorter than width of pterostigma; second submarginal cell of fore wing long, and subparallel-sided; hind wing vein SC+R1 distinctly longer than vein 1r-m; hind wing with 2 bristles baso-anteriorly and with 3 hamuli on vein R1, membrane largely glabrous near vein cu-a; tarsal claws without lobe, with setae, but often pectinate basally; metasomal tergites often largely sculptured; T1 movably joined to T2; T1 median area strongly convex and sculptured, with angulate sides and a medio-longitudinal carina; T1 lateral areas wide; T1 with dorsal carinae but absent basally; T2 with small smooth medio-basal area, often smooth, rarely rugose, and connected to median carina posteriorly, lateral grooves wide; second metasomal suture deep and crenulate; T3–4 with antero-lateral grooves, and latero-posterior corner protruding, more or less smooth; T2–4 with sharp lateral crease; T3–5 with transverse posterior grooves (sometimes absent on T3); hypopygium medium-sized and apically acute, not emarginate medio-apically; ovipositor normal, subapically upper valve with nodus, and its lower valve with teeth ventrally.

Biology. Unknown.

Distribution. Oriental.

Key to Chinese species of the genus *Indabracon* van Achterberg

- 1 Pterostigma entirely dark brown, or apical 1/5 slightly paler or pale brown; T1 largely smooth, with a few striae antero-laterally and medially.....2
- At least basal half of pterostigma yellow and remainder dark brown, sometimes with black spots basally and its apical third; T1 largely coarsely sculptured, especially median area and lateral grooves4
- 2 Smooth postero-lateral areas of T3 large; scutellum pale yellowish brown; fore wing vein 1-SR+M at most weakly curved; T1 pale yellowish brown laterally and its median area black; ovipositor sheath about 0.75 times as long as fore wing*I. trimaculatus*
- Smooth postero-lateral areas of T3 small; scutellum black or reddish brown; fore wing vein 1-SR+M strongly curved basally; T1 entirely whitish yellow; ovipositor sheath 0.4–0.6 times as long as fore wing3

- 3 Head largely reddish brown, face reddish yellow; mesoscutum reddish brown; hind wing vein 2-SC+R longer than vein 1r-m; in dorsal view length of eye 3.0 times temple; temples strongly narrowed behind eyes..... *I. discolor* sp. nov.
- Head largely yellow; mesoscutum yellow, but middle lobe anteriorly and lateral lobes with a black spot; hind wing vein 2-SC+R shorter than vein 1r-m; in dorsal view length of eye 2.6 times temple; temples linearly narrowed behind eyes..... *I. albogilvus* sp. nov.
- 4 Fore wing vein 1-SR+M at most weakly curved basally; basal half of pterostigma yellow and its apical half dark brown *I. bicolor*
- Fore wing vein 1-SR+M strongly curved basally; pterostigma largely yellow and its apical third mainly black 5
- 5 Scutellum black medially; T1 reddish yellow laterally; T4–5 entirely black; fore wing vein CU1b half as long as vein 3-CU1 *I. nigricans* sp. nov.
- Scutellum yellow medially; T1 black laterally; T4–5 pale yellow laterally, T4 with a large black mark medially, not reaching posterior margin of tergite, and T5 with a semicircular black mark medio-basally; fore wing vein CU1b 0.7 times as long as vein 3-CU1..... *I. semicircularis* sp. nov.

***Indabracon albogilvus* sp. nov.**

<http://zoobank.org/A7DFE4DC-0454-4FDE-A274-63B024080C8A>

Figs 1, 2

Type material. **Holotype.** ♀, China, Yunnan Prov., Xishuangbanna Meng'a, 1050–1080m, 17.X.1958, Chen Zhizi, No. IOZ(E)1964562 (IZCAS). **Paratypes:** 1♀, China, Yunnan Prov., Xishuangbanna Yunjinghong, 900m, 28.VI.1958, Zhang Yiran, No. IOZ(E)1964578 (IZCAS). 1♀, China, Yunnan Prov., Xishuangbanna Damenglong, 650m, 10.IV.1958, Hong Chunpei, No. IOZ(E)1964560 (IZCAS).

Diagnosis. This new species is very similar to *I. trimaculatus* (Cameron, 1900), but can be separated from the latter by the following characters: scutellum black (pale yellowish brown in *I. trimaculatus*); fore wing vein cu-a curved basally, slightly postfurcal (straight and interstitial in *I. trimaculatus*); fore wing vein 1-SR+M strongly curved basally (more or less straight, or weakly curved in *I. trimaculatus*); smooth postero-lateral areas of T3 small (large in *I. trimaculatus*); ovipositor sheath 0.4–0.5 times as long as fore wing (about 0.8 times in *I. trimaculatus*).

Description. Holotype, ♀, length of body 6.4 mm, of fore wing 6.6 mm, of ovipositor sheath 2.4 mm.

Head. Antenna with 42 segments; apical antennal segment strongly acute, 2.1 times longer than its maximum width (Fig. 2l); third segment 1.1 and 1.2 times longer than fourth and fifth, respectively, the latter 1.3 times longer than wide; length of maxillary palp 0.8 times height of head; malar suture present, and with sparse, short setae (Fig. 2i); clypeus height: inter-tentorial distance: tentorio-ocular distance = 3: 5: 3; clypeus with sparse, long setae; eye hardly emarginated (Fig. 2g); face with some

punctures, especially laterally (Fig. 2g); eye height: shortest distance between eyes: head width = 20: 18: 41; frons largely smooth except for a few weak punctures, with a strong narrow median groove (Fig. 2h); vertex largely smooth except for a few weak punctures, and with some sparse short setae; POL: OD: OOL = 4: 4: 11; length of malar space 1.6 times basal width of mandible; length of eye 2.4 times temple in dorsal view; temples largely glabrous except for a few short setae, and directly narrowed behind eyes (Fig. 2h).

Mesosoma. Length of mesosoma 1.8 times its height (Fig. 2c); notauli impressed anteriorly half (Fig. 2d); mesoscutum smooth, with sparse long setae (Fig. 2d); scutellar sulcus wide, deep, and with crenulae (Fig. 2d); scutellum distinctly convex, sparsely punctate, and with dense short setae posteriorly; metanotum strongly convex medially, and with a short median carina anteriorly (Fig. 2d); propodeum largely smooth except for some crenulae posteriorly, and with sparse setae medially, and dense, long setae laterally (Fig. 2d).

Wings. Fore wing (Fig. 2a): SR1: 3-SR: r = 12: 9: 2; 1-SR+M weakly curved after arising from 1-M, and 1.5 times longer than 1-M; 2-SR: 3-SR: r-m = 8: 18: 5; CU1b 0.8 times as long as 3-CU1; cu-a weakly postfurcal, and slightly bent basally towards base of wing. Hind wing (Fig. 2b): 1r-m more or less straight; SC+R1: 2-SC+R: 1r-m = 19: 5: 7.

Legs. Length of fore femur: tibia: tarsus = 18: 21: 25; length of hind femur: tibia: basitarsus = 25: 37: 12; length of femur, tibia and basitarsus of hind leg 3.8, 6.7 and 4.0 times their maximum width, respectively.

Metasoma. Length of T1 0.9 times its apical width, median area convex and striate-rugose, lateral areas largely smooth but anteriorly striate-rugose (Fig. 2j); lateral grooves of T1 sparsely and weakly crenulate anteriorly (Fig. 2j); T2 largely coarsely sculptured, but medio-basal area smooth (Fig. 2e); antero-lateral grooves of T2 developed and crenulate (Fig. 2e); second suture deep and crenulate, wide and straight medially, narrow laterally (Fig. 2e); T3–4 with antero-lateral grooves, and latero-posterior corner small; T3–5 coarsely sculptured, and with crenulate transverse subposterior groove (Fig. 2e); T6–7 largely smooth, and with spare long setae posteriorly; hypopygium acute apically, not reaching level of apex of metasoma; ovipositor sheath 0.4 times as long as fore wing.

Colour. Largely black (Fig. 1); head yellow, but antenna, eyes, and mandible apically black; prothorax, notaulic area, median mesoscutal lobe posteriorly and tegulae yellow (Fig. 2c, d, g, h); fore legs (except for first segment of tarsus posteriorly, second–fifth segment of tarsus, and claws black) yellow; T1 whitish yellow, T6–7 pale yellow posteriorly (Fig. 2e, j); wing membrane fuscate, pterostigma (except basal yellow patch) and veins dark brown (Fig. 2a, b).

Variation. Length of body of female 6.4–8.3 mm, of fore wing of female 6.5–7.6 mm, and of ovipositor sheath 2.4–3.1 mm; antenna of female with 40–44 segments; length of mesosoma 1.6–1.8 times its height; fore wing vein CU1b 0.6–0.8 times as long as vein 3-CU1; tegulae sometimes black, and pterostigma sometimes uniformly black.

Biology. Unknown.



Figure 1. *Indabracon albogilvus* sp. nov., ♀, holotype, habitus lateral.

Distribution. China (Yunnan).

Etymology. Named after the whitish yellow colour of the T1: “albogilvus” is Latin for “whitish yellow”.

***Indabracon bicolor* Yang, Chen & Liu, 2006**

Indabracon bicolor Yang, Chen & Liu, 2006a: 321; Chen et Yang, 2006: 123.

Biology. Unknown.

Distribution. China (Fujian).

Note. The type specimens of this species were collected in SE China (Fujian).

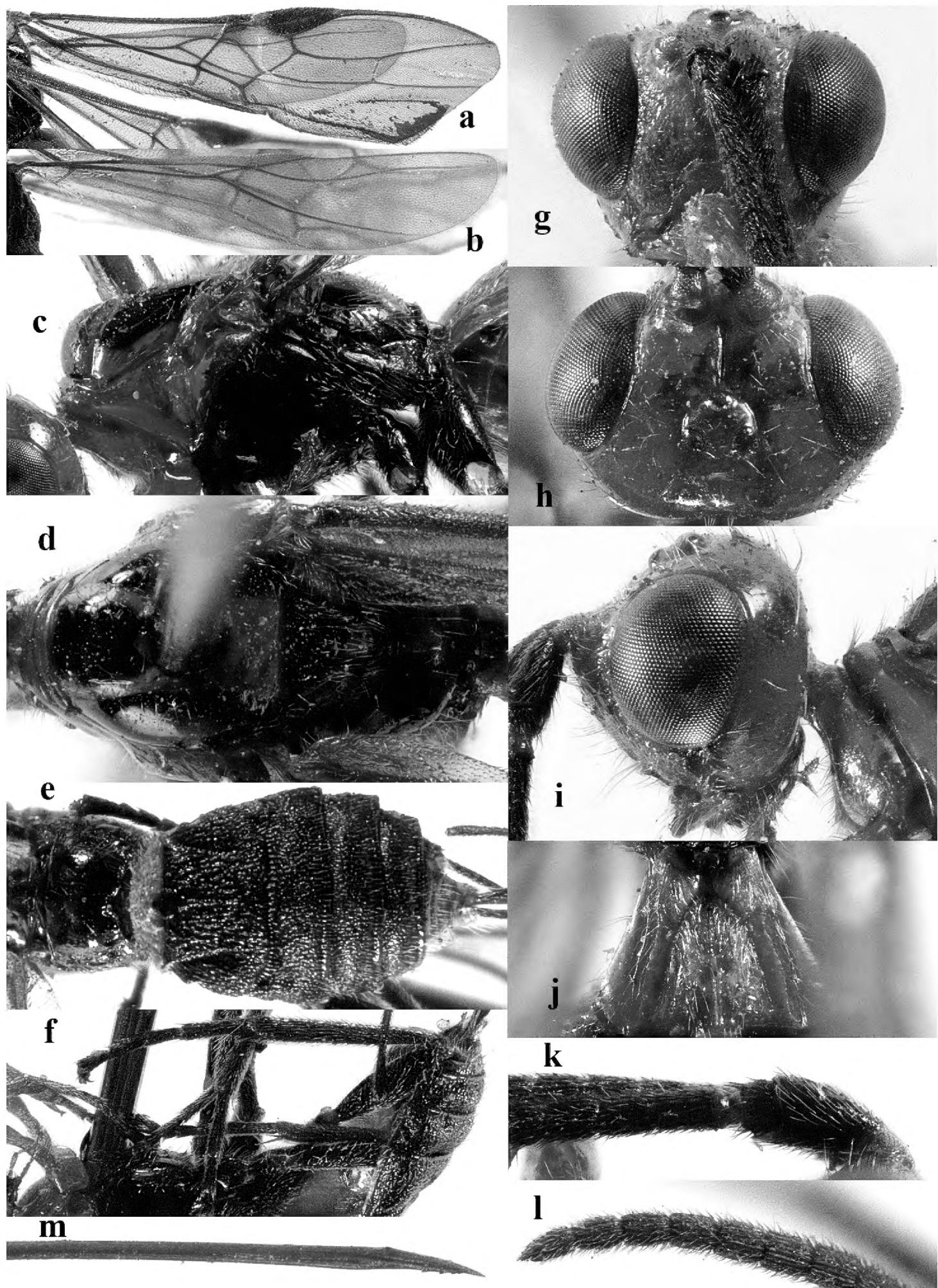


Figure 2. *Indabracon albogilvus* sp. nov., ♀, holotype **a** fore wing **b** hind wing **c** mesosoma, lateral view **d** mesosoma, dorsal view **e** metasoma, dorsal view **f** hind leg, lateral view **g** head, front view **h** head, dorsal view **i** head, lateral view **j** first metasomal tergite, dorsal view **k** scapus outer side, lateral view **l** apex of antenna **m** apex of ovipositor, lateral view.

***Indabracon discolor* sp. nov.**

<http://zoobank.org/397DBCAC-5BB8-4675-87BD-3B9FA19B2A49>

Figs 3, 4

Type material. **Holotype.** ♀, China, Yunnan Prov., Xishuangbanna Meng'a, 1050–1080m, 20.VIII.1958, Pu Fuji, No. IOZ(E)1964571 (IZCAS). **Paratypes:** 1♀, same label data, but Wang Shuyong, No. IOZ(E)1964563 (IZCAS).

Diagnosis. This new species is very similar to *I. albogilvus* sp. nov., but can be separated from the latter by the following characters: head largely reddish brown, but face reddish yellow (largely yellow in *I. albogilvus*); mesoscutum reddish brown (yellow, but lobes with black spot in *I. albogilvus*); hind wing vein 2-SC+R longer than vein 1r-m (shorter than vein 1r-m in *I. albogilvus*); in dorsal view length of eye 3.0 times temple and temples strongly narrowed behind eyes (length of eye 2.6 times temple and temples gradually narrowed behind eyes in *I. albogilvus*).

Description. Holotype, ♀, length of body 9.7 mm, of fore wing 9.1 mm, of ovipositor sheath 5.6 mm.

Head. Antenna with 56 segments; apical antennal segment strongly acute, 1.8 times longer than its maximum width (Fig. 4l); third segment 1.2 and 1.3 times longer than fourth and fifth, respectively, the latter as long as wide; length of maxillary palp 0.8 times height of head; malar suture rather weak, punctate and with short setae (Fig. 4i); clypeus height: inter-tentorial distance: tentorio-ocular distance = 3: 14: 7; clypeus with dense, long setae; eye hardly emarginated (Fig. 4g); face coarsely rugose, with some striae and long setae laterally (Fig. 4g); eye height: shortest distance between eyes: head width = 22: 18: 39; frons largely smooth except for a few weak punctures, with some sparse short setae and a strong median groove (Fig. 4h); vertex largely smooth except for a few weak punctures, and with some sparse short setae; POL: OD: OOL = 3: 4: 6; length of malar space 1.3 times basal width of mandible; length of eye 3.0 times temple in dorsal view; temples largely glabrous except for a few long setae, and directly narrowed behind eyes (Fig. 4h).

Mesosoma. Length of mesosoma 1.7 times its height (Fig. 4c); notauli impressed anteriorly half (Fig. 4d); mesoscutum smooth, with sparse long setae (Fig. 4d); scutellar sulcus wide, deep, and with crenulae (Fig. 4d); scutellum distinctly convex, moderately densely punctate, and with dense short setae posteriorly; metanotum strongly convex medially, and with a short median carina anteriorly (Fig. 4d); propodeum largely smooth except for a few weak punctures and some crenulae medio-posteriorly, and with sparse setae medially, and dense, long setae laterally (Fig. 4d).

Wings. Fore wing (Fig. 4a): SR1: 3-SR: r = 29: 26: 4; 1-SR+M strongly angled after arising from 1-M, and 1.5 times longer than 1-M; 2-SR: 3-SR: r-m = 8: 26: 7; CU1b 0.5 times as long as 3-CU1; cu-a weakly postfurcal, and rather weakly bent basally towards base of wing. Hind wing (Fig. 4b): 1r-m more or less straight; SC+R1: 2-SC+R: 1r-m = 23: 10: 7.

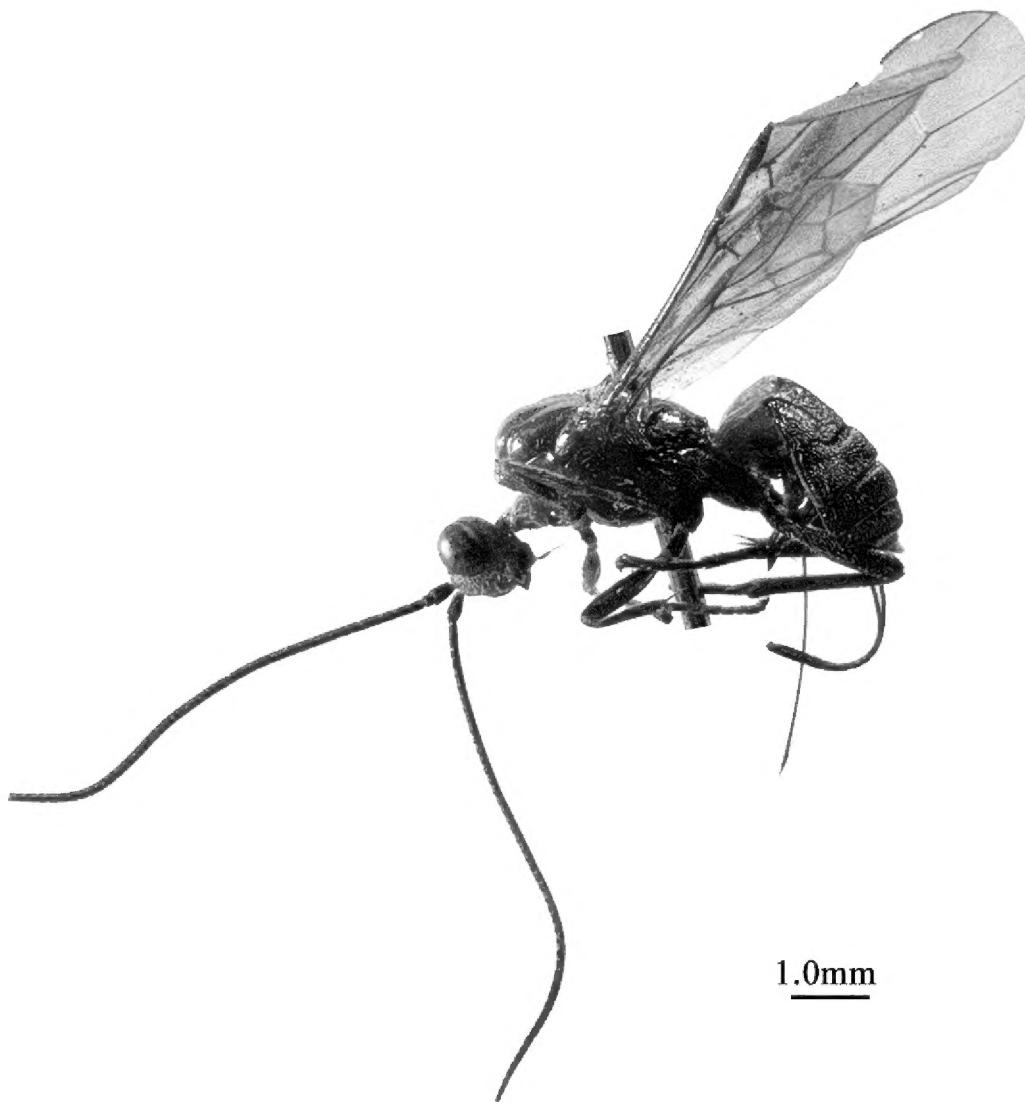


Figure 3. *Indabracon discolor* sp. nov., ♀, holotype, habitus lateral.

Legs. Length of fore femur: tibia: tarsus = 21: 25: 30; length of hind femur: tibia: basitarsus = 33: 50: 18; length of femur, tibia and basitarsus of hind leg 3.7, 8.3 and 6.0 times their maximum width, respectively.

Metasoma. Length of T1 1.1 times its apical width, median area convex and coarsely rugose, lateral areas largely smooth except for with a few striae anteriorly (Fig. 4j); lateral grooves of T1 sparsely crenulate (Fig. 4j); T2 largely coarsely sculptured, but medio-basal area smooth (Fig. 4e); antero-lateral grooves of T2 strongly developed and crenulate (Fig. 4e); second suture deep and crenulate, wide and straight medially, narrow laterally (Fig. 4e); T3–4 with antero-lateral grooves, and latero-posterior corner medium-sized; T3–5 coarsely sculptured, and with crenulate transverse subposterior groove (Fig. 4e); T6–7 largely weakly rugose, and with spare long setae posteriorly; hypopygium acute apically, not reaching level of apex of metasoma; ovipositor sheath 0.6 times as long as fore wing.

Colour. Largely black (Fig. 3); head and mesosoma largely reddish brown, but antenna, eyes, mandible apically and propodeum black, face reddish yellow (Fig. 4c, d, g); fore femur and tibia somewhat infuscate; T1 whitish yellow (Fig. 4j); wing membrane infuscate, pterostigma and veins dark brown (Fig. 4a, b).

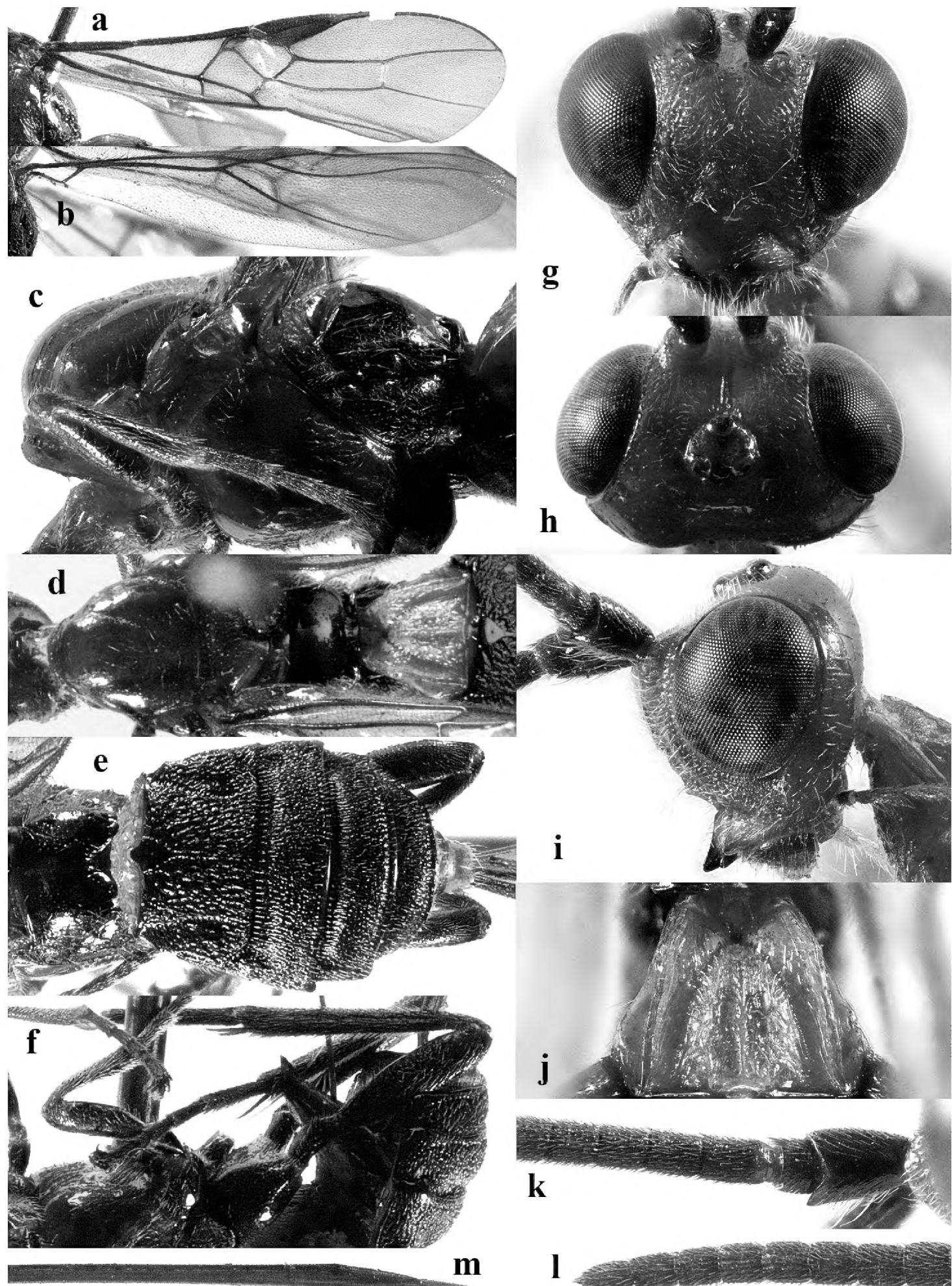


Figure 4. *Indabrona discolor* sp. nov., ♀, holotype **a** fore wing **b** hind wing **c** mesosoma, lateral view **d** mesosoma, dorsal view **e** metasoma, dorsal view **f** hind leg, lateral view **g** head, front view **h** head, dorsal view **i** head, lateral view **j** first metasomal tergite, dorsal view **k** scapus outer side, lateral view **l** apex of antenna **m** apex of ovipositor, lateral view.

Variation. Length of body of female 7.3–9.7 mm, of fore wing of female 6.8–9.1 mm, and of ovipositor sheath 2.7–5.6 mm; ovipositor sheath 0.4–0.6 times as long as fore wing; fore femur and tibia sometimes reddish yellow ventrally.

Biology. Unknown.

Distribution. China (Yunnan).

Etymology. Named after the T1 whitish yellow, while the remainder tergites black: “discolor” is Latin for “not of the same color”.

***Indabracon nigricans* sp. nov.**

<http://zoobank.org/3AD4EAE3-A4EE-453A-A4C3-D4FB71EDE1DD>

Figs 5, 6

Type material. **Holotype.** ♀, China, Yunnan Prov., Xishuangbanna Yunjinghong, 650m, 23.VII.1957, Zang Lingchao, No. IOZ(E)1964520 (IZCAS). **Paratype:** 1♀, China, Yunnan Prov., Xishuangbanna Cheli-Damenglong, 600m, 29.IV.1957, Liu Dahua, No. IOZ(E)1964541 (IZCAS).

Diagnosis. This new species is very similar to *I. bicolor* Yang et Chen, 2006, but can be separated from the latter by the following characters: scutellum black medially and remainder yellow, (entirely yellow in *I. bicolor*); apical third of pterostigma largely blackish (apical half of pterostigma dark brown and remainder yellow in *I. bicolor*); fore wing vein CU1b relatively short, 0.5 times as long as vein 3-CU1 (0.8 times in *I. bicolor*); T1 reddish yellow laterally (whitish yellow in *I. bicolor*) and medio-basal area of T2 rugose (smooth in *I. bicolor*).

Description. Holotype, ♀, length of body 9.2 mm, of fore wing 8.7 mm, of ovipositor sheath 5.6 mm.

Head. Antenna incomplete, 49 segments remaining; third segment 1.2 and 1.3 times longer than fourth and fifth, respectively, the latter 1.1 times longer than wide; length of maxillary palp 0.9 times height of head; malar suture rather weak, sculptured, and with short setae (Fig. 6i); clypeus height: inter-tentorial distance: tentorio-ocular distance = 6: 10: 7; clypeus with dense, long setae; eye weakly emarginated (Fig. 6g); face punctate, especially laterally (Fig. 6g); eye height: shortest distance between eyes: head width = 14: 15: 30; frons largely smooth except for a few weak punctures, with some sparse short setae and a strong median groove (Fig. 6h); vertex largely smooth except for a few weak punctures, and with some sparse short setae; POL: OD: OOL = 4: 5: 12; length of malar space 1.4 times basal width of mandible; length of eye 2.0 times temple in dorsal view; temples largely glabrous except for a few long setae, and subparallel-sided behind eyes (Fig. 6h).

Mesosoma. Length of mesosoma 1.6 times its height (Fig. 6c); notauli impressed anteriorly half (Fig. 6d); mesoscutum largely smooth except for a few weak punctures, with sparse short setae (Fig. 6d); scutellar sulcus moderately narrow, deep, and with crenulae (Fig. 6d); scutellum distinctly convex, punctate especially posteriorly;



Figure 5. *Indabracon nigricans* sp. nov., ♀, holotype, habitus lateral.

metanotum strongly convex medially, and with a short median carina anteriorly (Fig. 6d); propodeum largely smooth except for a few weak punctures and some crenulae posteriorly, and with sparse setae medially, and dense, long setae laterally (Fig. 6d).

Wings. Fore wing (Fig. 6a): SR1: 3-SR: $r = 23: 16: 3$; 1-SR+M strongly bent after arising from 1-M, and 1.7 times longer than 1-M; 2-SR: 3-SR: $r-m = 6: 16: 5$; CU1b 0.5 times as long as 3-CU1; cu-a weakly postfurcal, and nearly not bent basally. Hind wing (Fig. 6b): 1r-m straight or nearly so; SC+R1: 2-SC+R: 1r-m = 14: 4: 9.

Legs. Length of fore femur: tibia: tarsus = 11: 13: 16; length of hind femur: tibia: basitarsus = 27: 42: 14; length of femur, tibia and basitarsus of hind leg 3.0, 6.0 and 3.5 times their maximum width, respectively.

Metasoma. Length of T1 0.9 times its apical width, median area convex and strongly coarsely rugose, medio-longitudinal carina only present posteriorly, lateral areas relatively narrow and smooth (Fig. 6j); lateral grooves of T1 distinctly crenulate (Fig. 6j); T2 coarsely sculptured including medio-basal area (Fig. 6e); antero-lateral grooves of T2 strongly developed and crenulate (Fig. 6e); second suture deep and crenulate, wide and curved medially, narrow laterally (Fig. 6e); T3–4 with antero-lateral grooves, and latero-posterior corner medium-sized; T3–5 coarsely sculptured, and with crenulate transverse subposterior groove (Fig. 6e); T6–7 largely rugose, and with dense long setae posteriorly; hypopygium acute apically, not reaching level of apex of metasoma; ovipositor sheath 0.6 times as long as fore wing.

Colour. Largely black (Fig. 5); head largely yellow, except for scapus yellow ventrally), eyes, stemmaticum and apex of mandible black (Fig. 6g, h, k); pro-

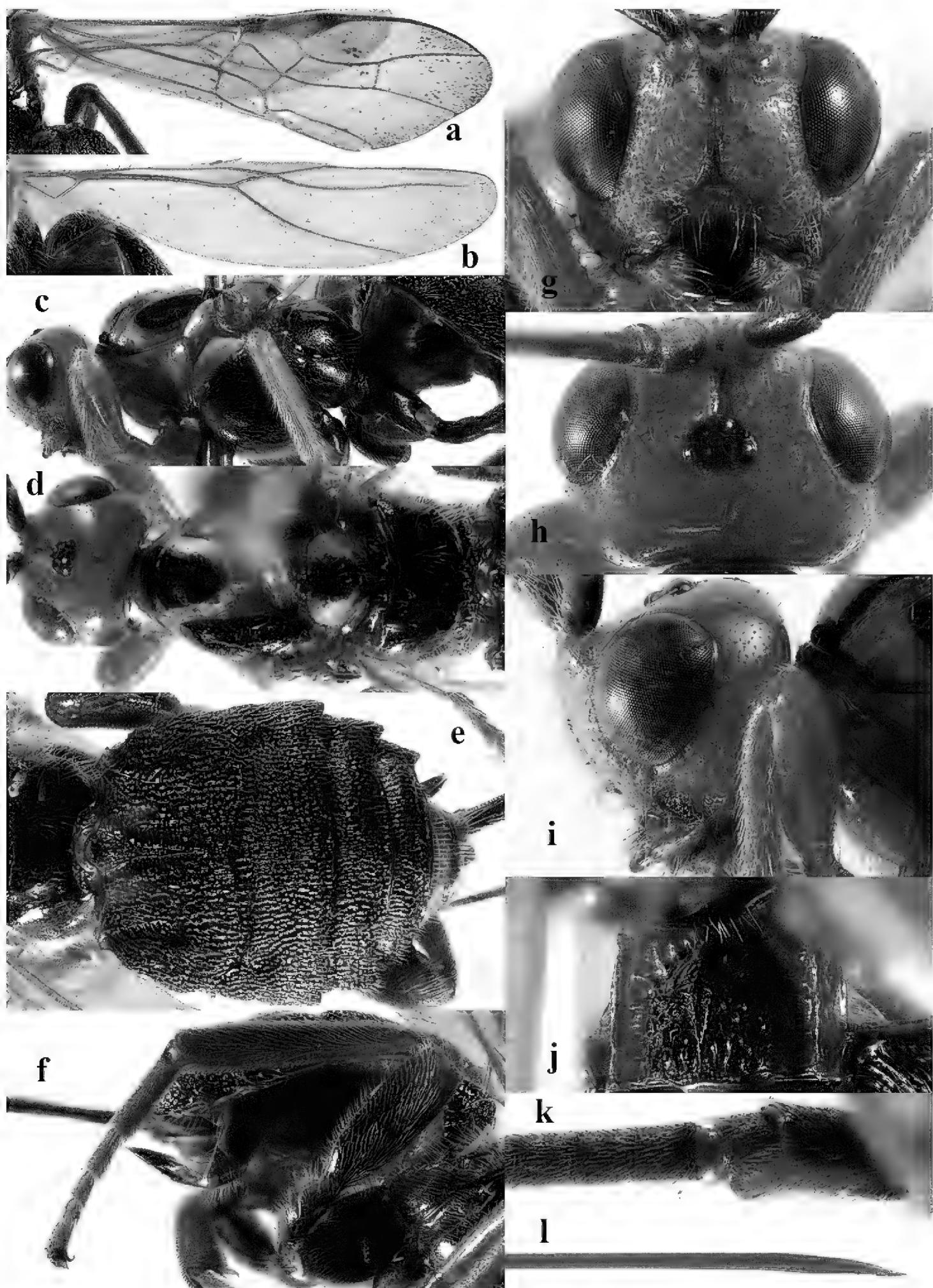


Figure 6. *Indabracon nigricans* sp. nov., ♀, holotype **a** fore wing **b** hind wing **c** mesosoma, lateral view **d** mesosoma, dorsal view **e** metasoma, dorsal view **f** hind leg, lateral view **g** head, front view **h** head, dorsal view **i** head, lateral view **j** first metasomal tergite, dorsal view **k** scapus outer side, lateral view **l** apex of ovipositor, lateral view.

thorax, notaular area, median mesoscutal lobe posteriorly, tegulae, and scutellum laterally yellow (Fig. 6c, d); fore (except for black claws) and middle legs (but coxa and claws black) yellow; T1 yellowish brown anteriorly and laterally, T6–7 pale yellow (Fig. 6e, j); wing membrane infuscate, and pterostigma (but blackish apically) yellow, veins dark brown (Fig. 6a, b).

Variation. Length of body of female 9.2–9.4 mm, of fore wing of female 8.4–8.7 mm, and of ovipositor sheath 5.6–6.2 mm; antenna with 51 segments; apical antennal segment acute, twice longer than wide; length of mesosoma 1.6–1.7 times its height; ovipositor sheath 0.6–0.7 times as long as fore wing.

Biology. Unknown.

Distribution. China (Yunnan).

Etymology. Named after the blackish colour of the metasomal tergites: “nigricans” is Latin for “blackish”.

***Indabracon semicircularis* sp. nov.**

<http://zoobank.org/6609AFE3-BA4B-4F79-B93D-143E8B2E637A>

Figs 7, 8

Type material. Holotype. ♀, China, Yunnan Prov., Xishuangbanna Meng'a, 1050–1080m, 13.X.1958, Wang Shuyong, No. IOZ(E)1964518 (IZCAS).

Diagnosis. This new species is very similar to *I. bicolor* Yang et Chen, 2006, but can be separated from the latter by the following characters: pterostigma largely yellow (apical half of pterostigma dark brown in *I. bicolor*); fore wing vein 1-SR+M strongly curved basally (at most weakly curved basally in *I. bicolor*); T1 black laterally (whitish yellow laterally in *I. bicolor*); T2 with sub-lateral areas (sub-lateral areas absent in *I. bicolor*); and ovipositor sheath 0.8 times as long as fore wing (0.6 times in *I. bicolor*).

Description. Holotype, ♀, length of body 10.0 mm, of fore wing 8.8 mm, of ovipositor sheath 7.2 mm.

Head. Antenna with 54 segments; apical antennal segment acute, 2.1 times longer than its maximum width (Fig. 8l); third segment 1.2 and 1.3 times longer than fourth and fifth, respectively, the latter 1.1 times longer than wide; length of maxillary palp 0.8 times height of head; malar suture moderately developed, sculptured and with dense, short setae (Fig. 8i); clypeus height: inter-tentorial distance: tentorio-ocular distance = 5: 12: 10; clypeus with sparse, long setae; eye weakly emarginated (Fig. 8g); face punctate, and with dense, short setae (Fig. 8g); eye height: shortest distance between eyes: head width = 18: 18: 37; frons largely smooth except for a few weak punctures, with a strong median groove (Fig. 8h); vertex largely smooth except for some sparse punctures, and with some sparse short setae; POL: OD: OOL = 4: 5: 14; length of malar space 1.7 times basal width of mandible; length of eye 1.5 times temple in dorsal view; temples smooth, with some long setae, and rather weakly narrowed behind eyes (Fig. 8h).

Mesosoma. Length of mesosoma 1.7 times its height (Fig. 8c); anterior half of notaular area impressed (Fig. 8d); mesoscutum smooth, with sparse long setae (Fig. 8d);

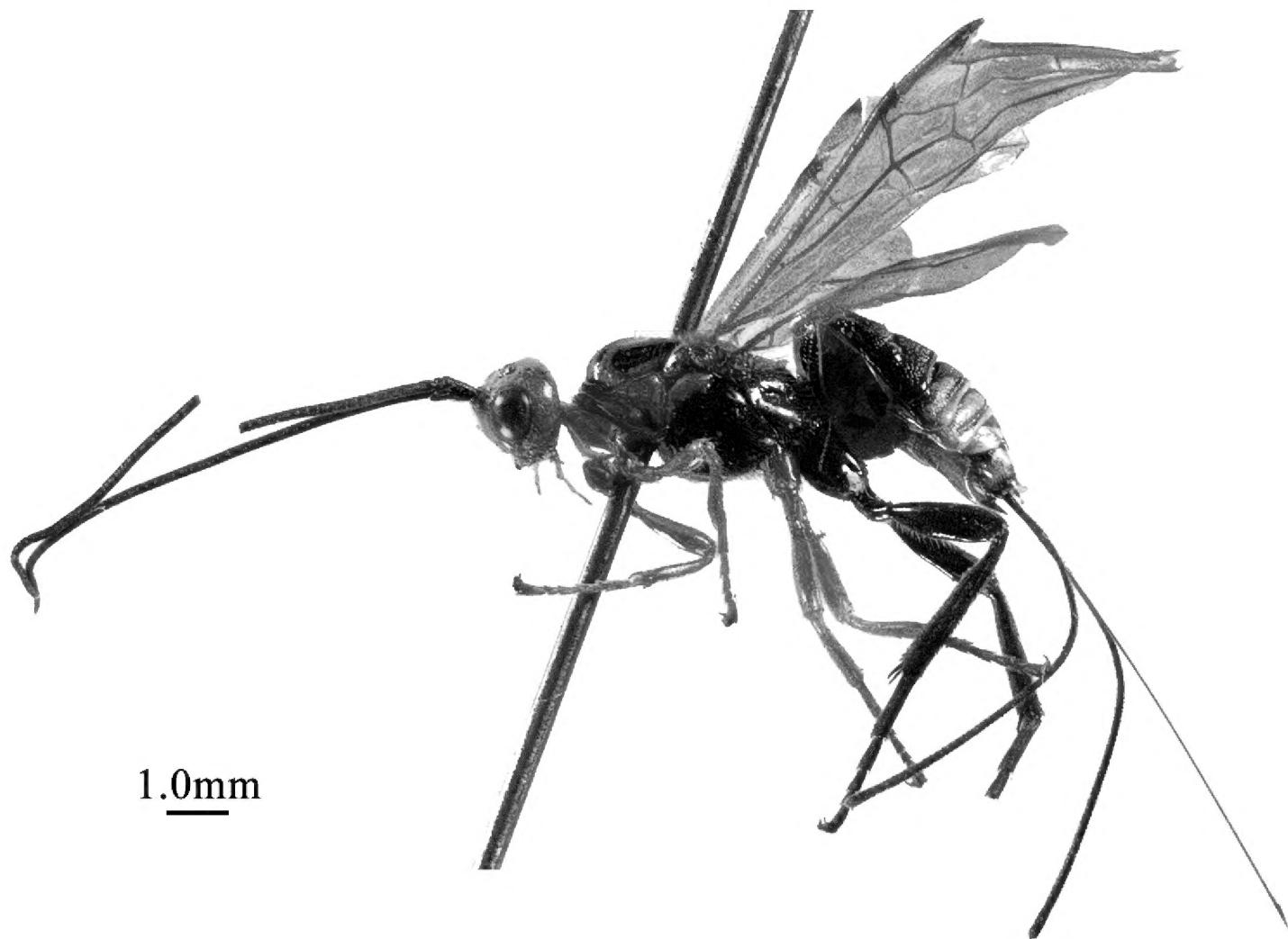


Figure 7. *Indabracon semicircularis* sp. nov., ♀, holotype, habitus lateral.

scutellar sulcus moderately wide, deep, and with crenulae (Fig. 8d); scutellum distinctly convex, smooth, and with some short setae posteriorly; metanotum strongly convex medially, and with a short median carina anteriorly (Fig. 8d); propodeum largely smooth except for some crenulae posteriorly, and with sparse setae medially, and dense, long setae laterally (Fig. 8d).

Wings. Fore wing (Fig. 8a): SR1: 3-SR: r = 22: 16: 3; 1-SR+M distinctly bent after arising from 1-M, and 1.7 times longer than 1-M; 2-SR: 3-SR: r-m = 7: 16: 6; CU1b 0.7 times as long as 3-CU1; cu-a subinterstitial, and nearly straight basally. Hind wing (Fig. 8b): 1r-m more or less straight; SC+R1: 2-SC+R: 1r-m = 6: 2: 3.

Legs. Length of fore femur: tibia: tarsus = 19: 22: 28; length of hind femur: tibia: basitarsus = 30: 47: 17; length of femur, tibia and basitarsus of hind leg 3.7, 9.4 and 4.9 times their maximum width, respectively.

Metasoma. T1 as long as its apical width, median area convex and strongly coarsely rugose, with a few carinae, medio-longitudinal carina only present posteriorly, lateral areas relatively narrow and smooth (Fig. 8j); lateral grooves of T1 distinctly crenulate (Fig. 8j); T2 largely coarsely striate-rugose except for smooth medio-basal area (Fig. 8e); antero-lateral grooves of T2 wide but rather shallow, weakly crenulate (Fig. 8e); second suture deep and crenulate, wide and more or less straight medially, narrow laterally (Fig. 8e); T3–4 with antero-lateral grooves, and latero-posterior corner medium-size; T3–4 striate-rugose (T4 relatively weak so); T3–5 with crenulate transverse sub-

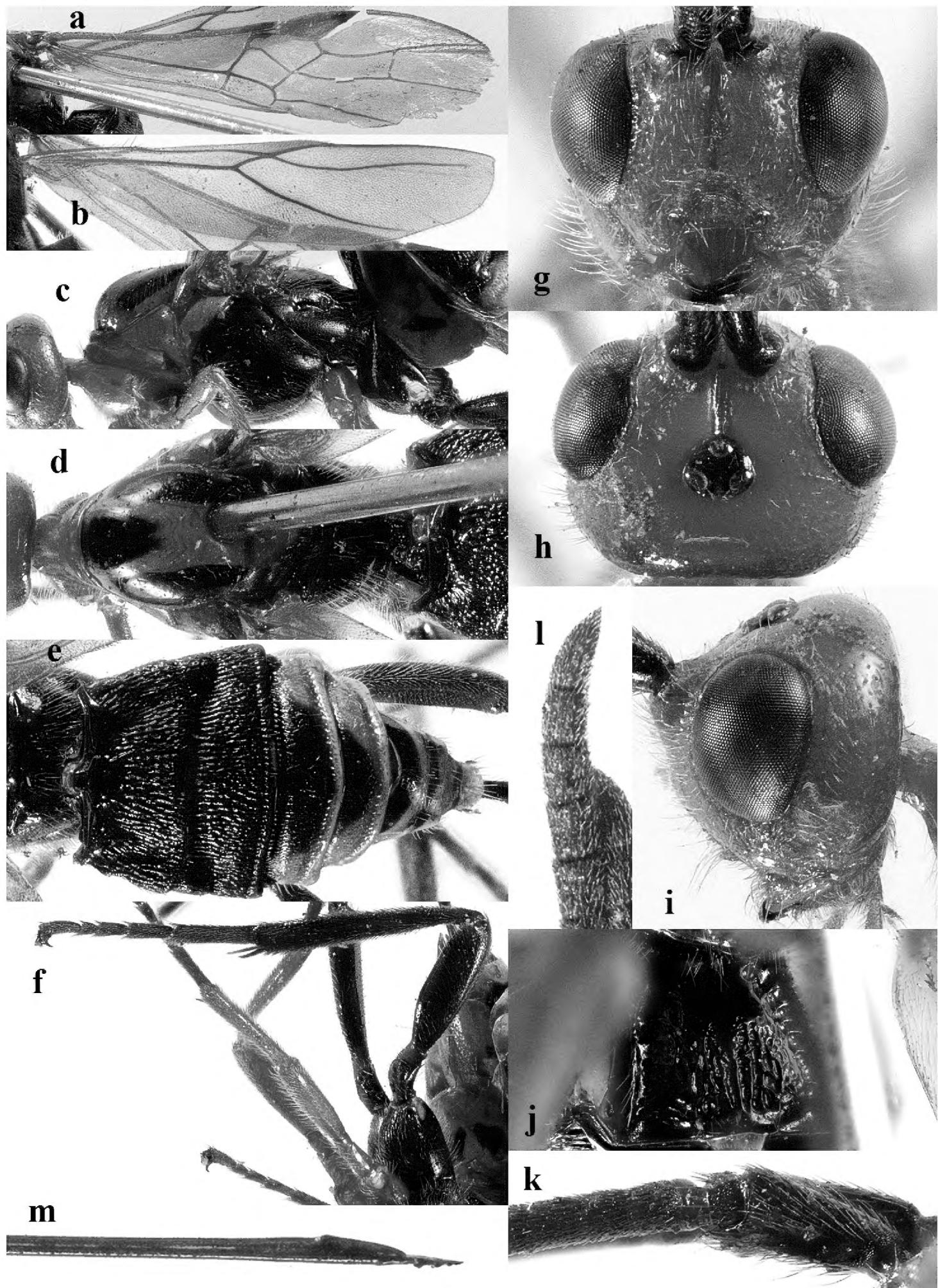


Figure 8. *Indabraccon semicircularis* sp. nov., ♀, holotype **a** fore wing **b** hind wing **c** mesosoma, lateral view **d** mesosoma, dorsal view **e** metasoma, dorsal view **f** hind leg, lateral view **g** head, front view **h** head, dorsal view **i** head, lateral view **j** first metasomal tergite, dorsal view **k** scapus outer side, lateral view **l** apex of antenna **m** apex of ovipositor, lateral view.

posterior groove (Fig. 8e); T5–7 largely smooth, and with some long setae posteriorly; hypopygium acute apically, not reaching level of apex of metasoma; ovipositor sheath 0.8 times as long as fore wing.

Colour. Largely black (Fig. 7); head largely yellow, but antenna, eyes, stemmatum and apex of mandible black (Fig. 8g, h); prothorax, notaular area, median mesoscutal lobe posteriorly, tegulae, and scutellum yellow (Fig. 8c, d); fore (but claws black) and middle legs (but tarsi and claws blackish) yellow; T4–5 yellow, but T4 black medially (except for posterior margin) and T5 with a half-rounded black spot medio-basally (Fig. 8e); posterior margins of T6–7 pale yellow (Fig. 8e); wing membrane yellowish, pterostigma (except for apical dark brown spot) yellow, veins largely yellow, hind wing vein 2-M dark brown (Fig. 8a, b).

Biology. Unknown.

Distribution. China (Yunnan).

Etymology. Named after the shape of the black spot on the T5: “semi” and “circularis” are Latin for “half” and “round”, respectively.

Indabracon trimaculatus (Cameron, 1900)

Spinaria trimaculata Cameron, 1900: 81; Shenefelt 1975: 1259 (generic position doubtful); Quicke et Walker, 1991: 420 (comparison with *Bicarinibracon*).

Indabracon trimaculatus (Cameron): van Achterberg, 1992: 387; Chen et Yang, 2006: 125.

Biology. Unknown.

Distribution. China (Fujian); India.

Note. Chen et Yang (2006) reported the species from Fujian (SE China).

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References

Cameron P (1900) Hymenoptera Orientalia, or Contributions to the knowledge of the Hymenoptera of the Oriental zoological region, Part IX. The Hymenoptera of the Khasia Hills.

Part II. Section I. Memoirs and Proceedings of the Manchester Literary and Philosophical Society 44(15): 1–114.

Chen J-H, Yang J-Q (2006) Systematic studies on Braconinae of China (Hymenoptera: Braconidae). Fujian Science and Technology Publishing House, Fujian, 304pp.

Chen X-X, van Achterberg C (2019) Systematics, phylogeny and evolution of braconid wasps: 30 years of progress. *Annual Review of Entomology* 64: 335–358. <https://doi.org/10.1146/annurev-ento-011118-111856>

Quicke DLJ, Walker C (1991) A new Indo-Australian genus of Braconinae (Insecta, Hymenoptera, Braconidae). *Zoologica Scripta* 20: 419–424. <https://doi.org/10.1111/j.1463-6409.1991.tb00305.x>

Shenefelt RD (1975) Braconidae 8. Exothecinae, Rogadinae. *Hymenopterorum Catalogus (nova editio)*. Pars 12, 1115–1262.

van Achterberg C (1988) Revision of the subfamily Blacinae Foerster (Hymenoptera, Braconidae). *Zoologische Verhandelingen Leiden* 249: 1–324.

van Achterberg C (1990) Illustrated key to the subfamilies of the Holarctic Braconidae (Hymenoptera: Ichneumonoidea). *Zoologische Mededelingen Leiden* 64: 1–20.

van Achterberg C (1992) Four new genera of the subfamily Braconinae (Hymenoptera: Braconidae) from the Indo-Australian region. *Zoologische Mededelingen Leiden* 66(16–40): 381–397.

van Achterberg C (1993) Illustrated key to the subfamilies of the Braconidae (Hymenoptera: Ichneumonoidea). *Zoologische Verhandelingen Leiden* 283: 1–189.

Yang J-Q, Chen J-H, Liu J-J (2006) The discovery of the genus *Indabracon* van Achterberg (Hymenoptera: Braconidae: Braconinae) in China, with description of one new species. *Insect Science* 13(4): 319–323. <https://doi.org/10.1111/j.1744-7917.2006.00100.x>

Yu DS, van Achterberg C, Horstmann K (2016) Taxapad 2016, Ichneumonoidea 2015. Database on flash-drive. Nepean, Ontario, Canada. <http://www.taxapad.com>